(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 November 2001 (08.11.2001)

PCT

(10) International Publication Number
WO 01/82760 A1

(51) International Patent Classification[7]: A47J 31/46, 31/40

(21) International Application Number: PCT/EP01/04076

(22) International Filing Date: 10 April 2001 (10.04.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
00109495.2 4 May 2000 (04.05.2000) EP

(71) Applicant *(for all designated States except US)*: **SOCIETE DES PRODUITS NESTLE S.A.** [CH/CH]; P.O. Box 353, CH-1800 Vevey (CH).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **KOLLEP, Alexandre** [CH/CH]; Chemin des Chênes 25, CH-1095 Lutry (CH). **FISCHER, Daniel** [CH/CH]; Grundstrasse 15, CH-8590 Romanshorn (CH). **STIEGER, Mischa** [CH/CH]; Hagenbuchstrasse 30c, CH-9000 St.-Gallen (CH).

(74) Agent: **THOMAS, Alain**; Avenue Nestlé, 55, CH-1800 Vevey (CH).

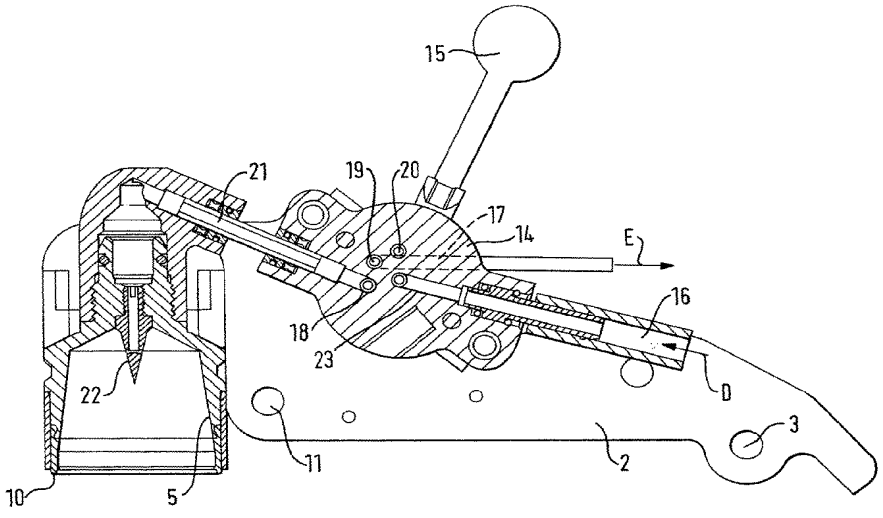
(81) Designated States *(national)*: AE, AU, BR, CA, CN, CZ, HU, ID, IL, JP, MA, MX, NO, PL, SG, SI, SK, TR, UA, US.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DEVICE FOR THE EXTRACTION OF A SUBSTANCE HAVING A MOVEABLE COMPONENT



(57) Abstract: The present invention relates to a device for the extraction of a substance for the preparation of a beverage, comprising a fixed first component, a second component moveable (2) relative to the first along an axis of rotation (3) arranged at the rear of said two components, the front of each component forming a housing (5) for the substance to be extracted, and means for closing and opening the two components, said means being integral with the fixed part and with the moveable part, said device comprising, furthermore, a control (15) and a valve (14) associated with said control, which are placed on the upper part of the moveable second component (2), in such a way that said control (15) and said valve (14) are near to the housing (5) for the substance to be extracted.

WO 01/82760 A1

Device for the extraction of a substance having a moveable component

The present invention relates to a device for the extraction of a substance for the preparation of a beverage, comprising

- a fixed first component,
- a second component moveable relative to the first along an axis of rotation arranged at the rear of said two components, the front of each component forming a housing for the substance to be extracted, and
- means for closing and opening the two components, said means being integral with the fixed part and with the moveable part.

In known coffee machines for the extraction of closed cartridges, for example the device which is the subject of the patent EP 412,570, there is no moveable part, so that the machine is in one piece and the water which stands in order to arrive at the housing of the substance to be extracted is in a hot environment, to be precise at a temperature of the order of 90°C. There is therefore no risk that the temperature of the water will fall. By contrast, in a machine with a moveable component, such as, for example, Patent Application WO 94/02059 and Patent Application EP 99117107.5 of 31 August 1999, the heating body of the machine is not in proximity to the housing for the substance to be extracted. The result of this is that, if the control for starting the machine and the valve integrated in the machine are placed at some distance from the housing for the substance to be extracted, there is a certain amount of standing water. In fact, the valve makes it possible for the heating body to empty as far as the valve, but not beyond it. The connecting pipe between the housing for the substance to be extracted and the valve remains full of water, said water in time

becoming cold. The more time elapses between two successive coffee preparations, the more the temperature of the water will fall and the greater will be the effect on the temperature of the coffee prepared afterwards.

The object of the present invention is, therefore, to reduce the amount of standing water, so that, from the moment when the machine is put into operation, there is only a slight effect on the temperature of the prepared coffee.

The present invention relates to a device for the extraction of a substance for the preparation of a beverage according to the preamble of Claim 1, in which said device comprises a control and a valve associated with said control, which are placed on the upper part of the moveable second component, in such a way that said control and said valve are near to the housing for the substance to be extracted.

The amount of standing water is thereby reduced significantly. For example, without the arrangement according to the invention, a volume of standing water of the order of 10-15 ml occurs, whereas, according to the invention, the volume of standing water is reduced to 1-3 ml. This means that, for a coffee volume of the order of 40-100 ml, even after relatively long intermission, the first coffee after said intermission has the same temperature as the others made by means of the device according to the invention. This is certainly not the case in the conventional system which may provide a coffee having a temperature 5°C lower because of the high volume of standing water.

The means used for closing and opening the two components may be of any type, in particular those

described in the abovementioned European Patent Application number 99117107.5.

The control of the system acts directly on the direction assumed by the water, that is to say on the valve for distributing the water. In the device according to the invention, the control and the associated valve have a position of rest, a beverage preparation position and a steam formation position. In the position of rest, the residual water is rejected: it goes without saying that this rejection takes place only at the moment when the control is switched into the position of rest, that is to say at the end of extraction, for example of a coffee cartridge. In the beverage preparation position, the water coming from the heating body passes directly into the housing for the substance to be extracted, for a duration necessary for extracting the cartridge. As mentioned above, at the end of extraction, there is a return to the position of rest. The last position is the steam generation position, for example in order to heat the milk during the preparation of a cappuccino coffee.

The type of valve which can be used according to the invention is not critical. A ceramic valve is preferably used.

The device according to the invention is normally actuated manually. It is also possible for the valve provided to be a solenoid valve controlled by electronics making it possible to stop the coffee at a preprogrammed volume.

The rest of the description is made with reference to the drawings in which:

Figure 1 shows in perspective a device for the preparation of a beverage having a moveable component,

Figure 2 is a diagrammatic illustration of the device according to the invention at rest, and

Figure 3 is a diagrammatic illustration of the device according to the invention in the coffee preparation position.

The device for beverage preparation comprises:

- a fixed first component (1),
- a second component (2) moveable relative to the first along an axis of rotation (3) arranged at the rear of said two components, the front of each component (1, 2) forming a housing (4) and (5), respectively, for the substance to be extracted,
- said device comprising furthermore, means for closing and opening the two components, said means comprising a two-armed closing lever (6) and two pull rods (7).

This device and also its functioning are already described in the abovementioned European patent application.

A closing lever (6) comprises the gripping part (8) and the actual lever part which has a virtually 90° bend. The pull rod may be straight or, as in the figure, have curved ends. The housing (4) comprises a peripheral rim (9) and the housing (5) a peripheral rim (10).

The two arms of the closing lever (6) are fastened rotatably along a first axis (11) on either side of the second component (2) and the pull rods (7) are fastened rotatably along a second axis (12) on either side of the first component (1). Those two ends of the two arms of the closing lever which are opposite the gripping part (8) and the two ends of the pull rods (7) are integral with one another along a third moveable axis (13), in such a way that the closing lever cooperates

with the rods in order to ensure the closing and opening of the device according to the invention.

The consumer arranges in the housing (4) a capsule or cartridge to be extracted (not illustrated). He then pulls the gripping part (8) of the closing lever (6) forwards in the direction of the arrow A, so as to cause said lever to rotate about its axis (11), this then driving the pull rod (7) upwards along the axis (13) and causing the moveable part (2) to descend (arrow B) towards the fixed part (1). The closing position is assumed when the closing lever is substantially in a horizontal position and the pull rods are in a vertical position. At this moment, the peripheral rims (9, 10) of the housings (4, 5) face one another and must ensure that the device has a high degree of leak-tightness.

Figures 2 and 3 show the control device which is not illustrated in Figure 1: this device is placed in the zone C of Figure 1 on the moveable part (2). The identical elements have been given the same reference numerals. The moveable part (2) comprises a housing (5) for the cartridge to be extracted and a peripheral rim (10). The valve (14) makes it possible to direct the hot water arriving via the conduit (16) either for rejection via the conduit (17) or towards the cartridge via the conduit (21) or for steam generation. This operation is made possible by the control (15): for this purpose, the control (15) is integral with a disc comprising a switching slot, and this disc, depending on its position, puts the main hot-water intake (23) in communication either with the outlet (19) for rejection or with the outlet (18) towards the cartridge to be extracted or with the outlet (20) for the generation of steam.

The device functions as follows: a cartridge is placed in the housing (4) and the user closes the moveable part (2) by lowering it by means of the gripping part (8). At rest, the device is in the position shown in Figure 2: the cartridge is in the housing (5) and the needle (22) pierces the top of said cartridge. The user then pulls the control (15) towards him, thereby putting the device into the position shown in Figure 3: the hot water passes via the conduits (16) and (21) and arrives at the needle (22) for extracting the cartridge. This extraction is known and described in Patent Application WO 94/02059: there is therefore no need to describe it again, since this extraction is not the subject of the present invention. The coffee flows into a cup arranged underneath the housing (4). When the amount of coffee in the cup is considered sufficient, the user pushes back the control (15) in order to return to the position shown in Figure 2: the residual water is then rejected via the conduit (17).

As mentioned above, the water which stands at the moment when the machine is not in use is only that which is in the conduit (21), thus corresponding to a volume of the order of 1-3 ml. This small amount does not have a great influence on the final temperature of the coffee obtained, that is to say it does not appreciably lower the temperature of the complete cup.

Claims

1. Device for the extraction of a substance for the preparation of a beverage, comprising:
   - a fixed first component,
   - a second component moveable relative to the first along an axis of rotation arranged at the rear of said two components, the front of each component forming a housing for the substance to be extracted, and
   - means for closing and opening the two components, said means being integral with the fixed part and with the moveable part,

said device being characterized in that itcomprises a control and a valve associated with said control, which are placed on the upper part of the moveable second component, in such a way that said control and said valve are near to the housing for the substance to be extracted.

2. Device according to Claim 1, characterized in that the control and the associated valve have a position of rest, a beverage preparation position and a steam formation position.

3. Device according to one of Claims 1 and 2, characterized in that the valve is a ceramic valve.

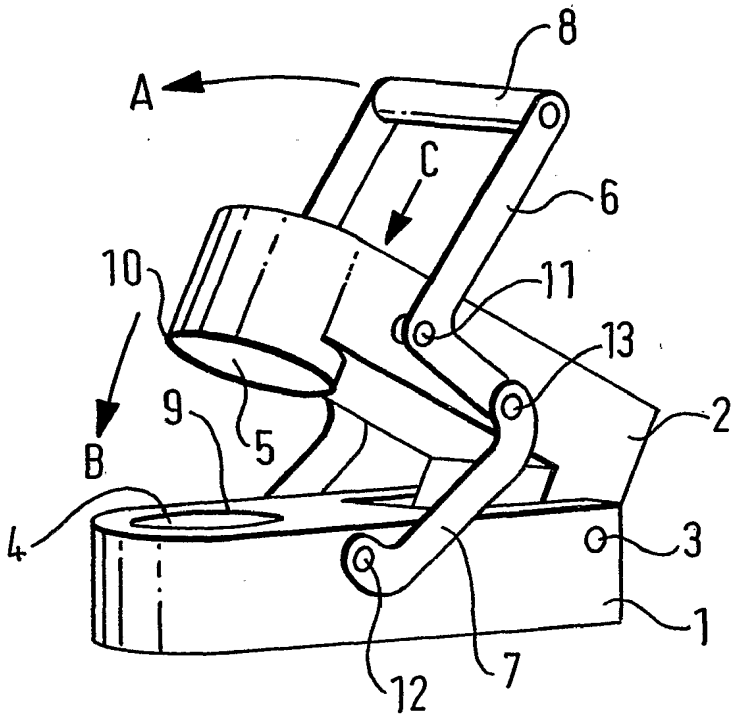


FIG. 1

FIG. 2

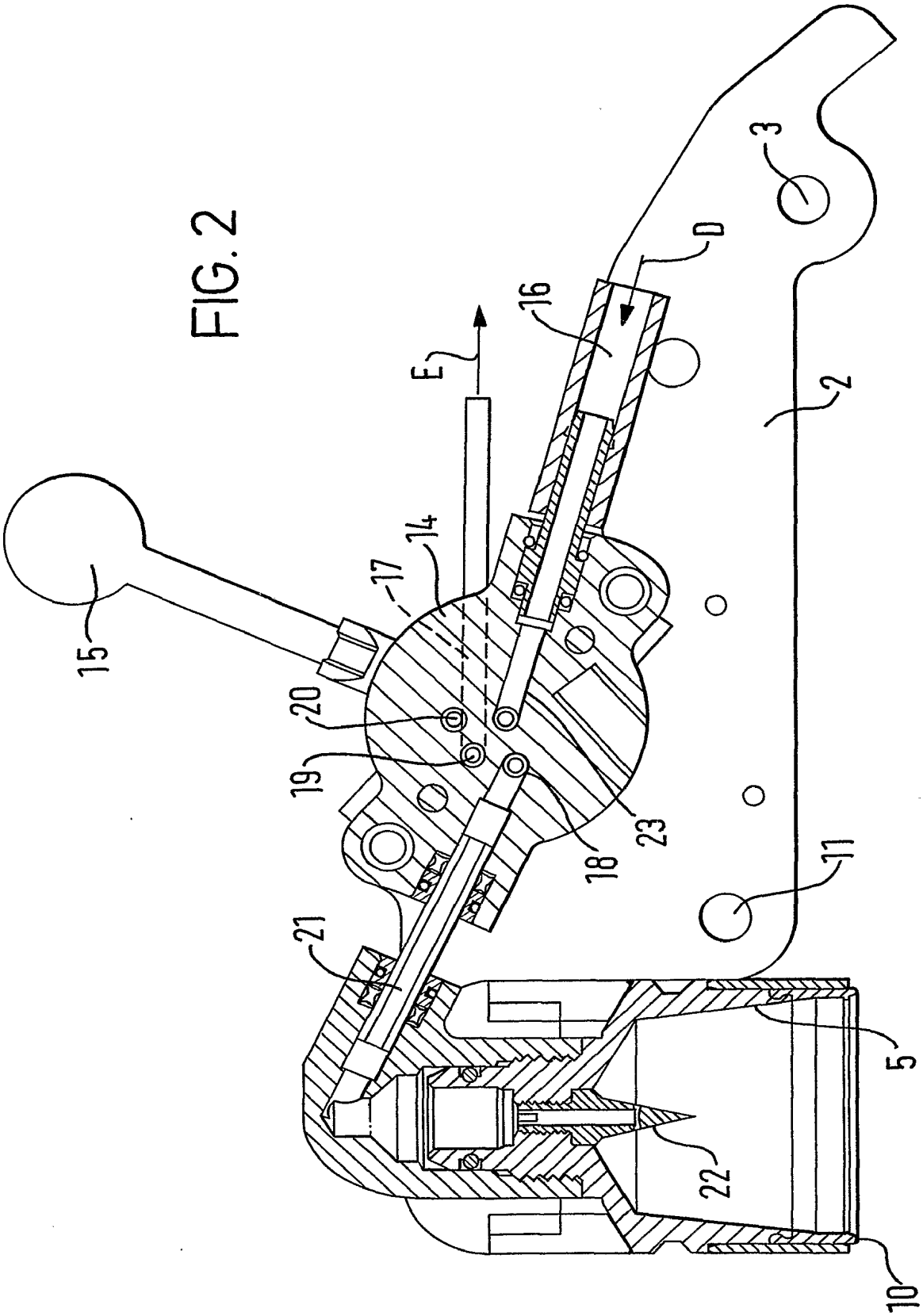
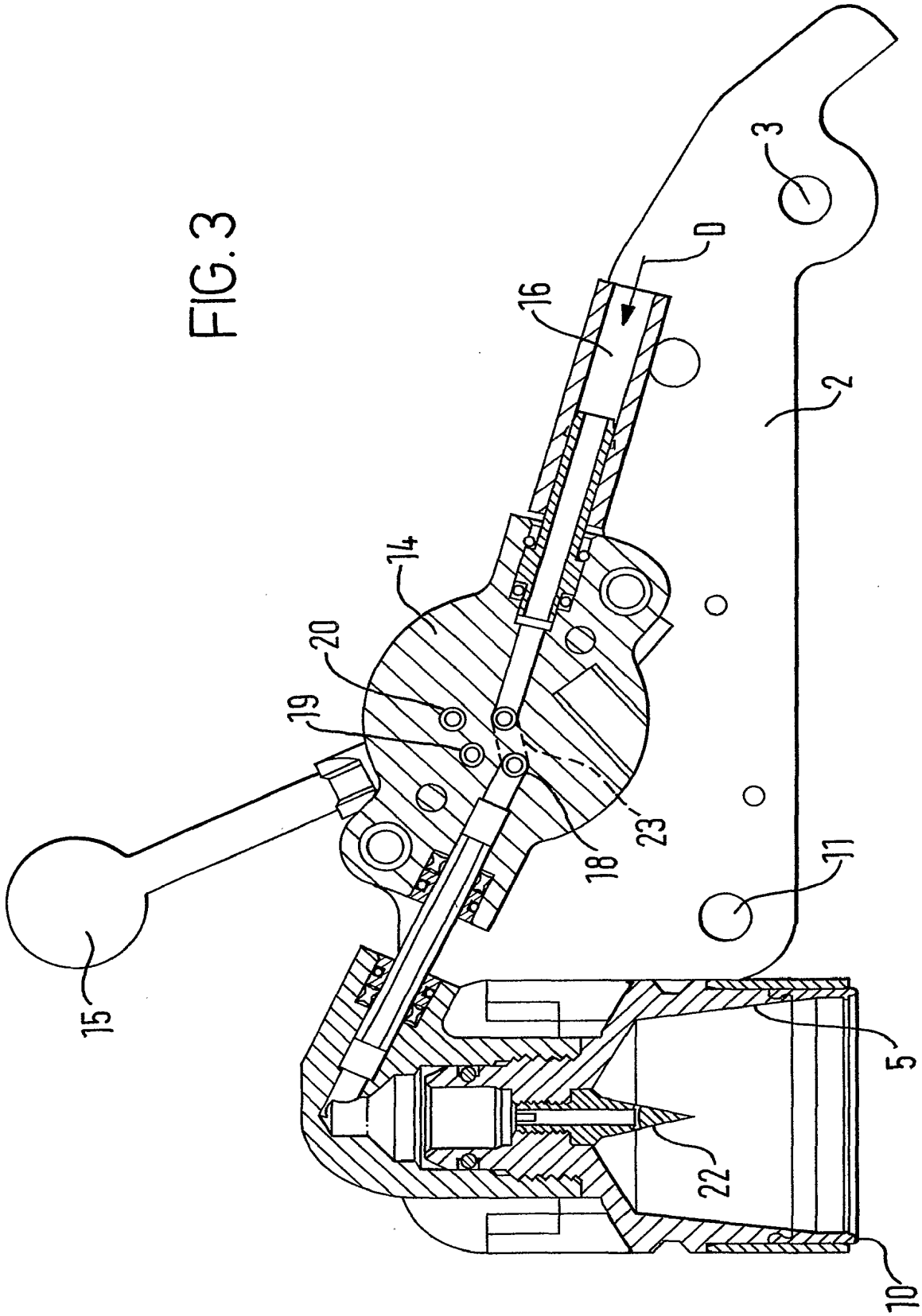


FIG. 3



INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 01/04076

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47J31/46 A47J31/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 14 04 127 A (RUDD-MELIKIAN INC) 24 October 1968 (1968-10-24) page 3, paragraph 3 -page 8, paragraph 1; figure 1	1-3
Y	US 4 947 738 A (EUGSTER) 14 August 1990 (1990-08-14) column 3, line 53 -column 6, line 15; figures 2,3	1-3
A	EP 0 862 882 A (C.M.A. S.P.A.) 9 September 1998 (1998-09-09) column 1, line 57 -column 3, line 21; figures 1,3	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 September 2001	10/09/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Bodart, P

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 01/04076

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1404127 A	24-10-1968	CH 362816 A	30-06-1962
		CH 365323 A	31-10-1962
		FI 41080 B	30-04-1969
		GB 939814 A	16-10-1963
		GB 939813 A	16-10-1963
		NL 6600997 A	25-04-1966
US 4947738 A	14-08-1990	EP 0307497 A	22-03-1989
		DE 8717864 U	29-11-1990
EP 862882 A	09-09-1998	IT MI970222 A	05-08-1998
		BR 9800558 A	31-08-1999
		CA 2228882 A	05-08-1998
		US 5921168 A	13-07-1999